Deer Creek

United States Department of Agriculture
Forest Service
Stanislaus National Forest
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Sonora, CA 95370-5909

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Reply To: 3420

Date: JUL - 7 1993

Subject: Field Evaluation of Fire Damaged Trees in the Deer Creek Fire Salvage Timber Sale Area (Report C93-9)

To: District Ranger, Mi-Wok

On May 18, 1993, I conducted a field evaluation of fire damaged trees in the Deer Creek Fire Salvage Sale Area. Dick Williamson, Chris Zimney, and Lyle Tallent, Mi-Wok Ranger District, were also present in the field. The objective of this evaluation was to review the District's marking guidelines for fire damaged trees and examine selected trees in Units 100, 106, and 111 for current bark beetle activity.

The analysis for this Sale covers approximately 1,846 of the 3,800 acres burned in the Ruby fire during September of 1992. These 1,846 acres are within an existing insect salvage sale that was sold in August of 1992. Within the area burned by the Ruby fire, 68% of the area burned at a high intensity, 17% at a moderate intensity, and 15% at a low intensity. The burned acres included in the Deer Creek Fire Salvage Sale area have higher percentages in the low and moderate categories. High intensity burned areas were characterized as being devoid of groundcover and the needle/leaf material was fully consumed. Moderate intensity was characterized by existing groundcover of less than 30% with some needle/leaf material remaining and low intensity had 50% or more existing groundcover and little or no needle/leaf burn.

It is the intent of the Ranger District to retain all trees that are likely to survive any fire-related injuries resulting from the Ruby fire. Fire-injured trees which are still alive this spring are being analyzed for retention or removal based on The Guidelines for Estimating the Survival of Fire-Damaged Trees in California by W. Wagener (Miscellaneous Paper No. 60, Pacific Southwest Forest and Range Experiment Station, 1961). Tables 1 & 2, extracted from the above mentioned publication, are included in this evaluation. Table 1. summarizes the criteria for trees expected to die and may be more easily implemented in cut tree marked units. Table 2. describes the criteria for trees expected to survive and may be more easily implemented in leave tree marked units.

Bark beetles, primarily western pine beetle, Dendroctonus brevicomis, have caused extensive ponderosa pine mortality in this drainage over the past few years. Western pine beetles emerge and attack trees continuously from spring through fall. Depending on the latitude and elevation, there can be from one to four generations per year. Initial attacks are made about mid-bole with subsequent attacks filling in above and below. Pheromones released during a successful attack attract other western pine beetles which also attack the original host tree or trees in the immediate area. These attacks, if successful, result in a "group" kill of ponderosa pines. Pitch tubes and red boring dust are indications of successful attacks.

The probability of post-fire bark beetle attack will increase with the number of other stress factors affecting the trees. Factors which could be important include stocking levels approaching or above normal basal area, drought, site quality and the growth and vigor of individual trees. In addition, trees experiencing sudden recent exposure, such as becoming isolated or being located along edges of severely burned areas may also be more susceptible to successful bark beetle attack.

Unit 100. Five, 20-24 inch DBH, ponderosa pine trees along Road 4N17 were examined. Most of the trees in this Unit had been or were being removed at the time this evaluation was conducted. This area appeared to have burned in a mosaic pattern with varying intensities occurring throughout. This burn pattern resulted in leaving small groups (3-5 trees) of trees with minimum crown scorch and minimal or no cambium damage. The 5-tree group we examined had minimal cambium damage and little or no crown damage. Based on Wagener's guidelines, these trees would be expected to survive the fire. There were no signs of current bark beetle attack in these trees.

Unit 111. Two groups of ponderosa pine trees were examined in this Unit. One group consisted of 8 trees that had been marked for retention based on Wagener's guidelines. These trees had minimum crown scorch and moderate cambium damage, however all were under current attack by western pine beetle. The adult beetle galleries were about 1/8 inch long. This suggests the overwintering beetle populations were just beginning to emerge and attack host trees. Any trees in the Sale area previously marked for retention should be re-examined for evidence of successful western pine beetle attack. All 8 infested trees in this group should be re-marked for removal.

An additional group of 5 ponderosa pine trees marked for retention was examined. This 5-tree group was located about 30 yards from the 8-tree infested group. Two of the five trees in this group were under current attack by western pine beetle and should be marked for salvage. Most, if not all of the remaining fire-damaged ponderosa pines adjacent to the groups we examined in this Unit were under attack by western pine beetle. The high level of western pine beetle activity in the area (evidenced by extensive pitch tubes) and the effective aggregation pheromone emitted by the western pine beetle both contribute to the probability being quite high that the remaining 3 live trees in the second group will be attacked.

Unit 106. This Unit was comprised of a mixed conifer stand which included ponderosa and sugar pine, white fir, and incense cedar. The amount of cambium damage to the residual live trees ranged from light to moderate. Crown damage appeared to be minimal in most cases. Applying Wagener's guidelines throughout this Unit would result in retaining most of the conifers. There was no apparent bark beetle activity in this area.

Slash Treatment

If pines with some green foliage are cut, any slash >3 inches diameter could be used as breeding material by pine engravers, Ips. spp. During the warm parts of the year pine engravers may complete their life cycle in less than 2 months. If populations are allowed to build-up and emerge from the slash an increase in the number of top-killed residual pines in the surrounding area can be expected. Pine slash can be treated by lopping and bucking the boles and larger stems into the shortest pieces possible. The material should be scattered so the stems are fully exposed to the sun. Other methods of slash treatment include chipping, removing from the site or piling and burning. Two practices which should generally be avoided are piling fresh slash without further treatment, and allowing slash to remain in contact with or near leave trees.

If there are any questions regarding this report please contact Sheri Smith at the Supervisor's Office.

Sheri Lee Smith

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Entomologist
South Sierra Shared Service Area

Enclosures:

cc: Dick Williamson, Mi-Wok RD
Sheri Smith, SO
John Wenz, SO

Table 1. Criteria for trees expected to die from fire-related damage.

Species (1)	Cambial Injury (2)		Green Foliage Remaining (3)
Ponderosa pine	> 25 %	and/or	0-9% of original crown
Sugar pine (4)	> 60 %	"	0-34% of original crown
White fir	> 25 %	"	0-34% of original crown
Incense cedar	> 25 %	"	0-34% of original crown

(1) These criteria are for: Site quality = above average
Growth vigor before fire = good

(2) Cambial injury refers to percent of circumference killed. Cambium killing that extends up the trunk for more than a few feet has a greater influence in reducing chances for survival than injury close to the ground.

(3) Green foliage refers to the proportion of green needles present after the fire without respect to location within the former crown, compared with green needle complement before the fire. Should be estimated in percent as closely as possible.

(4) Check sugar pine with basal scorch carefully at ground line. Thin bark can lead to cambium kill with only minor outward charring.

Extracted from Wagener, W. W. 1961. Guidelines for estimating the survival of fire-damaged trees in California. U.S. Forest Service Pacific Southwest Forest and Range Expt. Sta. Misc. Paper 60. 11 pp.

Table 2. Criteria for trees expected to survive fire-related damage.

Species (1)	Cambial Injury (2)		Green Foliage Remaining (3)
Ponderosa pine	0-25%	and	min:10% of original crown
Sugar pine (4)	0-60%	"	min:35% of original crown
White fir	0-25%	"	min:35% of original crown
Incense cedar	0-25%	"	min:35% of original crown

(1) These criteria are for: Site quality = above average
Growth vigor before fire = good

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